

fabric must meet the requirements specified for—

(i) “Bladder” materials in section 3.2.6 of MIL-L-24611(SH) if the material is an unsupported film; or

(ii) Coated fabric in section 3.1.1 of TSO-C13d if the material is a coated fabric.

(3) *Uncovered chambers.* Each material used in the construction of inflation chambers that are not covered with fabric must meet the requirements specified in paragraph (c)(2)(ii) of this section.

(d) *Thread.* Each thread must meet the requirements of subpart 164.023 of this chapter. Only one kind of thread may be used in each seam. Thread and fabric combinations must have similar elongation and durability characteristics.

(e) *Webbing.* Webbing used as a body strap, tie tape or drawstring, or reinforcing tape must meet §160.002-3(e), §160.002-3(f), §160.002-3(h) of this part respectively. Webbing used for tie tape or drawstring must easily hold a knot and be easily tied and untied. Webbing used as reinforcing tape must not chafe the wearer.

(f) *Closures—(1) Strength.* Each buckle, snap hook, dee ring or other type of fastening must have a minimum breaking strength of 1600 N (360 lbs). The width of each opening in a closure, through which body strap webbing passes, must be the same as the width of that webbing.

(2) *Means of Locking.* Each closure used to secure a lifejacket to the body, except a zipper, must have a quick and positive locking mechanism, such as a snap hook and dee ring.

(3) *Zipper.* If a zipper is used to secure the lifejacket to the body, it must be—

(i) Easily initiated;

(ii) Non-jamming;

(iii) Right handed;

(iv) Of a locking type; and

(v) Used in combination with another type of closure that has a quick and positive means of locking.

(g) *Inflation medium.* (1) No inflation medium may contain any compound that is more toxic than CO<sub>2</sub> if inhaled through any of the oral inflation mechanisms.

(2) Any chemical reaction of inflation medium during inflation must not produce a toxic residue.

(h) *Adhesives.* Adhesives must be waterproof and acceptable for use with the materials being bonded.

(i) [Reserved]

(j) *Retroreflective Material.* Each life-jacket must have at least 200 sq. cm. (31 sq. in.) of retroreflective material on its front side, at least 200 sq. cm. on its back side, and at least 200 sq. cm. of material on each reversible side. The retroreflective material must be Type I material that is approved under subpart 164.018 of this chapter. The retroreflective material attached on each side must be divided equally between the upper quadrants of the side. Attachment of retroreflective material must not impair lifejacket performance or durability.

(k) *PFD light.* Each lifejacket must have a PFD light that is approved under subpart 161.012 of this chapter and that meets the requirements of Regulations III/30.2 and III/32.3 of the 1983 Amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS 74/83). The light must be securely attached to the front shoulder area of the lifejacket. Attachment of the light must not impair lifejacket performance.

(l) [Reserved]

(m) *Whistle.* Each lifejacket must have a whistle of the ball type or multi-tone type and of corrosion-resistant construction. The whistle must be securely attached to the lifejacket by a lanyard. The lanyard must be long enough to permit the whistle to reach the mouth of the wearer. If the lanyard would normally allow the whistle to hang below the waist of the average size wearer, the whistle must be stowed in a pocket on the lifejacket. The attachment of the whistle must not impair lifejacket performance.

[CGD 78-1746, 54 FR 50320, Dec. 5, 1989, as amended by CGD 78-174b, 56 FR 29441, June 27, 1991; CGD 84-068, 58 FR 29494, May 20, 1993]

#### § 160.176-9 Construction.

(a) *General Features.* Each inflatable lifejacket must—

(1) Have at least two inflation chambers;

(2) Be constructed so that the intended method of donning is obvious to an untrained wearer;

(3) If approved for use on a passenger vessel, be inside a sealed, non-reusable package that can be easily opened;

(4) Have a retainer for each adjustable closure to prevent any part of the closure from being easily removed from the lifejacket;

(5) Be universally sized for wearers weighing over 40 kg. (90 pounds) and have a chest size range of at least 76 to 120 cm. (30 to 52 in.);

(6) Unless the lifejacket is designed so that it can only be donned in one way, be constructed to be donned with either the inner or outer surface of the lifejacket next to the wearer (be reversible);

(7) Not have a channel that can direct water to the wearer's face to any greater extent than that of the reference vest defined in §160.176-3(h) of this part;

(8) Not have edges, projections, or corners, either external or internal, that are sharp enough to damage the lifejacket or to cause injury to anyone using or maintaining the lifejacket;

(9) Have a means for drainage of entrapped water;

(10) Be primarily vivid reddish orange, as defined by sections 13 and 14 of the "Color Names Dictionary," on its external surfaces;

(11) Be of first quality workmanship;

(12) Unless otherwise allowed by the approval certificate—

(i) Not incorporate means obviously intended for attaching the lifejacket to the vessel; and

(ii) Not have any instructions indicating attachment to a vessel is intended; and

(13) Meet any additional requirements that the Commandant may prescribe, if necessary, to approve unique or novel designs.

(b) Inflation mechanisms. (1) Each inflatable lifejacket must have

(i) At least one automatic inflation mechanism;

(ii) At least two manual inflation mechanisms on separate chambers;

(iii) At least one oral inflation mechanism on each chamber; and

(iv) At least one manual inflation mechanism or one automatic inflation mechanism on each inflation chamber.

(2) Each inflation mechanism must

(i) Have an intended method of operation that is obvious to an untrained wearer;

(ii) Not require tools to activate the mechanism;

(iii) Be located outside its inflation chamber; and

(iv) Be in a ready to use condition.

(3) Each oral inflation mechanism must

(i) Be easily accessible after inflation for the wearer to "top off" each chamber by mouth;

(ii) Operate without pulling on the mechanism;

(iii) Not be able to be locked in the open or closed position; and

(iv) Have a non-toxic mouthpiece.

(4) Each manual inflation mechanism must

(i) Provide an easy means of inflation that requires only one deliberate action on the part of the wearer to actuate it;

(ii) Have a simple method for replacing its inflation medium cartridge; and

(iii) Be operated by pulling on an inflation handle that is marked "Jerk to Inflate" at two visible locations.

(5) Each automatic inflation mechanism must

(i) Have a simple method for replacing its inflation medium cartridge and water sensitive element;

(ii) Have an obvious method of indicating whether the mechanism has been activated; and

(iii) Be incapable of assembly without its water sensitive element.

(6) The marking required for the inflation handle of a manual inflation mechanism must be waterproof, permanent, and readable from a distance of 2.5 m (8 feet).

(c) *Deflation mechanism.* (1) Each chamber must have its own deflation mechanism.

(2) Each deflation mechanism must

(i) Be readily accessible to either hand when the lifejacket is worn while inflated;

(ii) Not require tools to operate it;

(iii) Not be able to be locked in the open or closed position; and

(iv) Have an intended method of operation which is obvious to an untrained wearer.

(3) The deflation mechanism may also be the oral inflation mechanism.

(d) *Sewn seams.* Stitching used in each structural seam of a lifejacket must provide performance equal to or better than a Class 300 Lockstitch meeting Federal Standard No. 751a.

(e) *Textiles.* All cut edges of textile materials must be treated or sewn to minimize raveling.

(f) *Body strap attachment.* Each body strap assembly must be securely attached to the lifejacket.

#### § 160.176-11 Performance.

(a) *General.* Each inflatable lifejacket must be able to pass the tests in § 160.176-13 of this part.

(b) *Snag Hazard.* The lifejacket must not present a snag hazard when properly worn.

(c) *Chamber Attachment.* Each inflation chamber on or inside an inflatable lifejacket must not be able to be moved to a position that-

(1) Prevents full inflation; or

(2) Allows inflation in a location other than in its intended location.

(d) *Comfort.* The lifejacket must not cause significant discomfort to the wearer during and after inflation.

#### § 160.176-13 Approval Tests.

(a) *General.* (1) This section contains requirements for approval tests and examinations of inflatable lifejackets. Each test or examination must be conducted or supervised by an independent laboratory. The tests must be done using lifejackets that have been constructed in accordance with the plans and specifications in the application for approval. Unless otherwise specified, only one lifejacket, which may or may not have been subjected to other tests, is required to be tested in each test. One or more lifejackets that have been tested as prescribed in paragraph (h) of this section must be used for the tests prescribed in paragraphs (j), (n), (q), and (r) of this section. The tests prescribed in paragraph (y) of this section require one or more lifejackets as specified in that paragraph.

(2) All data relating to buoyancy and pressure must be taken at, or corrected

to, an atmospheric pressure of 760 mm (29.92 inches) of mercury and a temperature of 20 °C (68 °F).

(3) The tests in this section are not required to be run in the order listed, except where a particular order is specified.

(4) Some tests in this section require a lifejacket to be tested while being worn. In each of these tests the test subjects must represent a range of small, medium, and large heights and weights. Unless otherwise specified, a minimum of 18 test subjects, including both males and females, must be used. The test subjects must not be practiced in the use of the lifejacket being tested. However, they must be familiar with the use of other Coast Guard approved lifejackets. Unless specified otherwise, test subjects must wear only swim suits. Each test subject must be able to swim and relax in the water.

NOTE: Some tests have inherent hazards for which adequate safeguards must be taken to protect personnel and property in conducting the tests.

(b) *Donning.* (1) No second stage donning is allowed in the tests in this paragraph. Test subjects may read the donning instructions to be provided with the device, if any. An uninflated lifejacket with size adjustment at its mid-range is given to each test subject with the instruction: "Please don as quickly as possible, adjust to fit snugly, and inflate." Each subject must, within one minute, don the uninflated lifejacket, adjust it to fit snugly, and then activate the manual inflation mechanism.

NOTE: For this test the manual inflation mechanism may be disabled.

(2) The average time of all subjects to complete the test in paragraph (b)(1) of this section must not exceed 30 seconds. The criteria in this paragraph do not apply to the tests in paragraphs (b)(3) and (b)(4) of this section.

(3) The test in paragraph (b)(1) of this section is repeated with each subject wearing an insulated, hooded parka and gloves made from heavy, cotton-jersey (knit) fabric.

(4) The test in paragraph (b)(1) of this section is then repeated twice more with a fully inflated lifejacket. In the